Amendments to the Claims:

This listing of claims below is believed to accurately reproduce the pending claims, but does not further amend those claims.

Listing of Claims:

1. (cancelled)

2. (cancelled)

3. (cancelled)

4. (cancelled)

5. (cancelled)

6. (cancelled)

7. (cancelled)

8. (cancelled)

9. (cancelled)

10. (previously presented) A copper electroplating bath, comprising:

water as a solvent;

copper ions;

pyrophosphate anions;

cations other than copper ions added to the electroplating bath as a salt of said anions, such that said anions are present in the electroplating bath in stoichiometric excess relative to said copper ions; and

2,5-dimercapto-1,3,4-thiadiazole at a concentration of less than 4 μM,

whereby copper metal is electrodeposited in Damascene trenches and vias to form circuitry on semiconductor chips.

11. (original) The copper electroplating bath of Claim 10, wherein said cations other than copper ions are not electroactive at the potential used for copper electrodeposition, such that relatively pure copper metal is deposited.

12. (original) The copper electroplating bath of Claim 11, wherein said cations other than copper ions are selected from the group consisting of K+, Na+, and NH4+ ions.

13. (original) The copper electroplating bath of Claim 10, further comprising:

a surfactant.

14. (original) The copper electroplating bath of Claim 13, wherein said surfactant is polyoxyethylene(10)isooctylphenylether.

15. (original) The copper electroplating bath of Claim 10, further comprising:

ions of at least one electroactive metal selected from the group consisting of silver, zinc, cadmium, iron, cobalt, nickel, tin, lead, bismuth, antimony, gallium and indium, such that a copper alloy deposit is obtained.

16. (cancelled)

17. (original) The copper electroplating bath of claim 10, wherein the temperature is maintained between 50°C and 60°C.

18. (original) The copper electroplating bath of Claim 10, wherein the pH is maintained in the 8.0 to 8.8 range.

19. (original) The copper electroplating bath of Claim 10, further comprising:

ammonia or ammonium ion.

20. (original) The copper electroplating bath of Claim 10, further comprising:

nitrate ion.

21. (cancelled)

22. (cancelled)

23. (cancelled)

24. (previously presented) A copper electroplating bath, comprising:

water as a solvent;

copper ions;

pyrophosphate anions;

cations other than copper ions added to the electroplating bath as a salt of said anions, such that said anions are present in the electroplating bath in stoichiometric excess relative to said copper ions;

2,5-dimercapto-1,3,4-thiadiazole at a concentration of less than 4 μM; and

a surfactant,

whereby copper metal is electrodeposited in Damascene trenches and vias to form circuitry on semiconductor chips.

25. (previously presented) A copper electroplating bath, comprising:

water as a solvent;

copper ions;

pyrophosphate anions;

cations other than copper ions added to the electroplating bath as a salt of said anions, such that said anions are present in the electroplating bath in stoichiometric excess relative to said copper ions;

2,5-dimercapto-1,3,4-thiadiazole at a concentration of less than 4 μM,

polyoxyethylene(10)isooctylphenylether as a surfactant;

ammonia or ammonium ion; and

nitrate ion,

whereby copper metal is electrodeposited in Damascene trenches and vias to form circuitry on semiconductor chips.

26. (previously presented) A process for electrodepositing copper circuitry in trenches and vias on semiconductor chips, comprising the steps of:

providing a semiconductor chip with trenches and vias to be filled with copper;

placing said chip in contact with an electroplating bath, said bath comprising:

water as a solvent,

copper ions,

pyrophosphate anions,

cations other than copper ions added to the electroplating bath as a salt of said anions, such that said anions are present in the electroplating bath in stoichiometric excess relative to said copper ions, and

2,5-dimercapto-1,3,4-thiadiazole at a concentration of less than 4 μM, and

electrodepositing copper in said trenches and vias.

27. (original) The process of Claim 26, wherein said cations other than copper ions are selected from the group consisting of K+, Na+, and NH4+ ions.

28. (original) The process of Claim 26, wherein the electroplating bath further comprises a surfactant.

29. (original) The process of Claim 28, wherein said surfactant is polyoxyethylene(10)isooctylphenylether.

30. (original) The process of Claim 26, wherein the temperature of the plating bath is maintained at a temperature between 50°C and 60°C.

31. (original) The process of Claim 26, wherein the pH of the electroplating bath is maintained in the 8.0 to 8.8 range.

32. (original) The process of Claim 26, wherein the electroplating bath further comprises ammonia or ammonium ion.

33. (original) The process of Claim 26, wherein the electroplating bath further comprises nitrate ion.